

Some new taxa in the Myrmosinae with keys to
the females in North America

(Hymenoptera: Tiphidae)

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The Holarctic tiphid subfamily Myrmosinae consists of moderate to small sized wasps in which there is a strong sexual dimorphism. The males are fully winged with a distinctly tripartite mesosoma and are either entirely black or black with the metasoma reddish. They are often much larger than the females which are apterous, have a bipartite mesosoma with a single functional suture and are reddish to brown in integumental color, often with part or all of the metasoma and sometimes part of the mesosoma black. In addition, the metasoma of the females may have cream-colored integumental markings. Both sexes are known for *Myrmosa* and *Myrmosula*. The Nearctic *Myrmosina* is known from males only.

The purpose of this paper is to provide the description of a new genus of Myrmosinae from the Colorado Desert of Southeastern California and descriptions of three new species of the Genus *Myrmosula*. In addition, keys are presented to the females of the genera of Myrmosinae and the species of *Myrmosula*.

For making possible the loan of material used in this study, I wish to thank the following persons and the institutions they represent: P. H. Arnaud, Jr., California Academy of Sciences, San Francisco (CAS); R. M. Bohart and R. O. Schuster, both University of California, Davis (UCD); J. A. Chemsak, California Insect Survey, University of California, Berkeley (CIS); J. C. Hall and S. Frommer, both University of California, Riverside (UCR); and K. V. Krombein, United States National Museum (USNM). Mrs. Ellen Parker prepared the illustrations.

In the following descriptions, the head is considered prognathous. Measurement of the propodeal width is between the outer rims of the spiracles. Explanation of abbreviations used for mensural ratios is given by Wasbauer (1968).

***Leiomyrmosa*¹ Wasbauer, new genus**

ADULT FEMALE.—Head, in posterior view, somewhat narrowed behind eyes, in dorsal view, rounded; antennal insertions covered only by thin, narrow lamellae;

¹ Gr. *Leios*: smooth, and *Myrmosa*: a combination of the Gr. *myrmex*—ant and L. *osus*—having the condition or quality of.

ocelli absent; clypeus evenly convex, without median proximal spine or tooth; mandibles tridentate, without lamella on ventral margin; legs slender, not heavily armed with spines; anterior coxa without tooth at anterior apex; anterior tarsi with well developed rake, outer apical angle of first and second tarsal segments with somewhat spatulate spine which is as long as succeeding segment, third and fourth segments with progressively shorter, less spatulate spines, outer surface of anterior basitarsus with row of several short spines; hind coxa dorsally at base with low, rounded elevation; first metasomal sternum with small, low, toothlike elevation anteriorly; pygidium not differentiated.

MALE.—Unknown. Possibly *Myrmosina* Krombein.

TYPE OF GENUS.—*Leiomyrmosa spilota* Wasbauer.

Leiomyrmosa appears to represent a modification of the *Myrmosa* line. This modification has been mainly toward loss or reduction of existing structures as shown by the lack of a clypeal spine, lack of ocelli, shallow punctation of the head, greatly reduced punctation of the mesosoma, lack of abundant erect pilosity, especially on the metasomal terga, the small elevations on the posterior coxae and the presence of only a very small tooth on the first metasomal sternum. It may be further distinguished from *Myrmosa* by the presence of a tarsal rake and from *Myrmosula* by the head narrowing immediately behind the eyes, the tridentate mandibles, without ventral lamellae, the lack of elevations at the anterior extremities of the hypostomal carinae and absence of a tooth anteriorly at the apex of the anterior coxa.

At present, the type is the only species known.

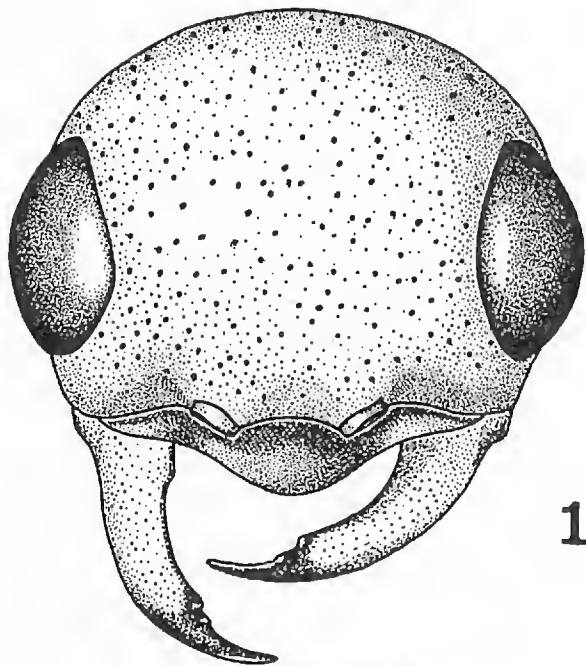
***Leiomyrmosa spilota* Wasbauer, new species**

(Figs. 1, 2, 19, 23)

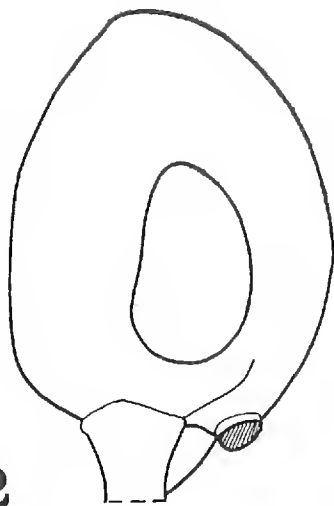
HOLOTYPE FEMALE.—Head, mesosoma and metasoma uniformly orange-brown except a pair of enamel white spots anteriorly on sides of second metasomal tergum; antennae darkened apically, apical third of mandibles reddish-black. Entire insect shining, head with small, shallow punctures, sparse on vertex, separated by an average of about their diameter on frons, less than their diameter on clypeus; mesosoma impunctate laterally with faint integumental reticulation; dorsum of pronotum and mesonotum with small, shallow punctures separated by average of somewhat more than their diameter, propodeum nearly impunctate. Metasoma with few small, shallow, scattered punctures before apex of each segment. Vestiture very sparse, consisting entirely of erect, straw-colored hairs, very short, scarcely noticeable on frons, vertex and dorsum of mesosoma and metasoma except for a few long hairs on pronotum anterolaterally and numerous shorter

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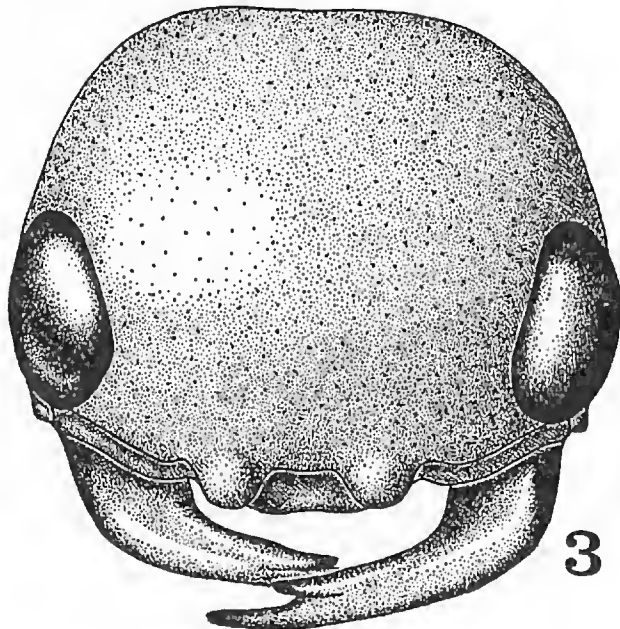
FIGS. 1-6. Heads of female Myrmosinae. Dorsal view on left, right lateral view on right. Figs. 1-2. *Leiomyrmosa spilota*. Figs. 3-4. *Myrmosula parvula*. Figs. 5-6. *Myrmosula exaggerata*.



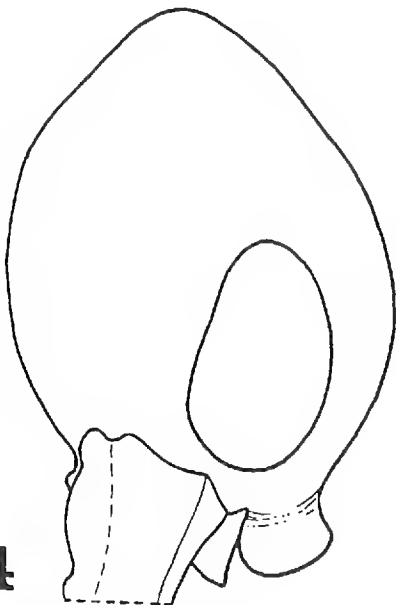
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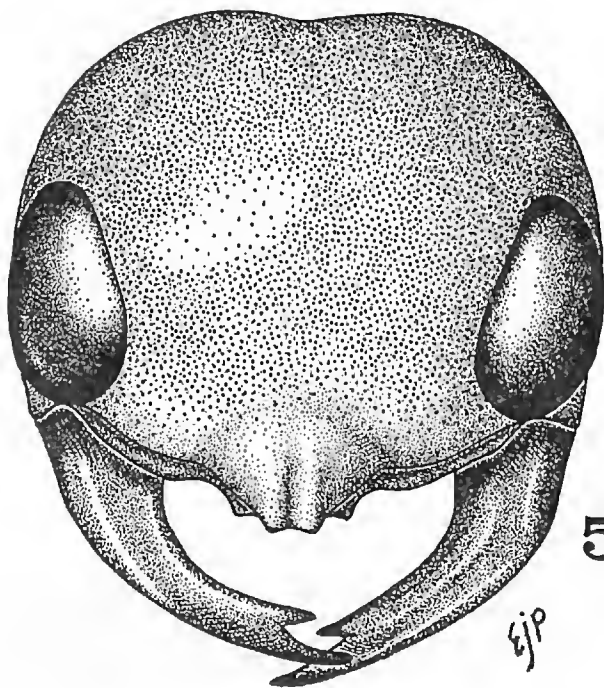
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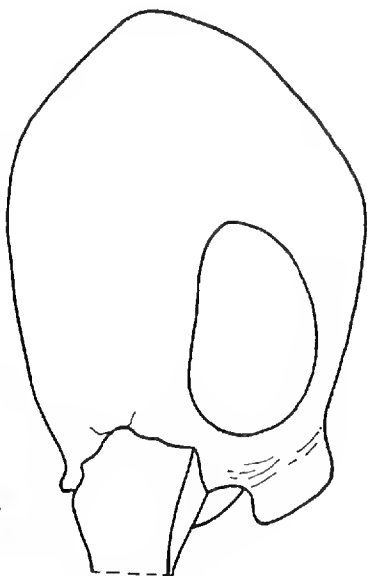
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hairs on anterior, declivous portion of first metasomal tergum; longest on clypeus, underside of head, prosternum and coxae; metasomal sterna with scattered long hairs before apex of each.

Head.—Rounded, slightly broader than long, TFD/FD 1.15, EH/FD 0.49, EH/MID 0.59, MID/TFD 0.72; vertex extending in an even arc above tops of compound eyes; antennae short, first four antennal segments in ratio of 3: 1: 1.2: 1.2; median lobe of clypeus convex in profile, apical margin simple, convex, without median lamella; mandible with apical tooth long, acute, proximal teeth very small; occipital carina incomplete ventrally; maxillary palpi six segmented, labial palpi four segmented.

Mesosoma.—Width ratios of mesosomal nota: pronotum 1.3; mesonotum 1.0; propodeum 1.2; pronotal length (measured from anterior margin of collar to apex of segment) 0.76 times width, humeral angles rounded, without projections. Vestiture of legs consisting of sparse, long, erect hairs, without appressed hairs or pubescence; anterior tibia without preapical spines, tibial spur spatulate, 0.73 times length of basitarsus; middle tibia with three rows of short, slender, slightly curved spines on anterior surface, dorsal row with six spines; posterior tibia with two spine rows.

Metasoma.—First tergum smooth, without carinae or ridges.

Length.—3.50 mm.

Variation ($n = 9$); length 2.68–3.65 mm.; TFD/FD 1.11–1.17; EH/FD 0.45–0.51; EH/MID 0.55–0.62; MID/TFD 0.71–0.75; color light reddish brown to nearly black (1 specimen). All paratype material was preserved in 70% alcohol before mounting and some color change was noted. On some specimens, for example, the white spots on the second metasomal tergum became very faint. However, the very dark paratype was nearly black in color when collected, so apparently considerable color variation occurs in nature.

HOLOTYPE (CAS #11896) and six paratypes 1 MILE WEST BLYTHE, RIVERSIDE COUNTY, CALIFORNIA, May 23–24, 1970, in cereal bowl pit traps, J. L. Johnson and M. Washbauer collectors (CAS, MSW); two paratypes, same locality, May 6, 1970, J. L. Johnson and E. L. Paddock collectors (USNM).

The type locality is a somewhat disturbed sand dune area on the edge of extensive cultivated fields. The first two or three inches of sand is loose and unconsolidated. Beneath this is packed, consolidated sand. The major plants in the immediate area are *Larrea divaricata*, *Franseria dumosa* and *Prosopis juliflora*. One hundred cereal bowl pit traps were deployed in an area roughly 40 by 40 feet. All specimens were taken in these between 5:00 and 8:00 p.m. Pacific Daylight Time.

MYRMOSULA Bradley

As currently recognized, the genus *Myrmosula* includes species restricted to the Nearctic region. Krombein (1940) recognized four species, one based on both sexes, one based on the male and two based on the female. Mickel (1940) described a fifth from the female and presented a key to the North American females. Krombein (1946) proposed still another species based on the female, and the descriptions

presented below bring the total to nine species for North America. Only one of these species, the widespread *M. parvula* (Fox) occurs in the eastern United States. Krombein (1940) gives its distribution as westward to Texas and Montana. The remainder are of more limited distribution in the western United States. One species is here described from Baja California Sur.

***Myrmosula nasuta* Wasbauer, new species**

(Figs. 7, 8, 20)

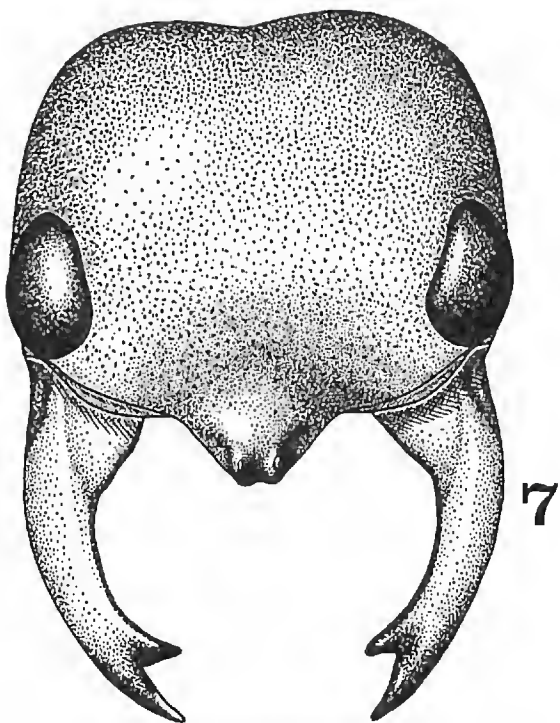
HOLOTYPE FEMALE.—Entirely orange-brown; tarsi somewhat darkened; tips of mandibles reddish black; second, third and fourth metasomal terga with dark brown apical band, interrupted medially on second and fourth; ultimate tergum entirely dark brown; second tergum with pair of anterolateral, creamy white, comma-shaped spots; fifth tergum with medioapical creamy white spot. Entire insect shining, punctation minute, punctures on vertex separated by average of less than their diameter; on frons and lower face slightly larger, separated by somewhat more than their diameter; on mesepisternum, slightly larger, separated by less than their diameter; sparse, scattered on lateral posterior surfaces of propodeum. Vestiture consisting of very short, erect to suberect hairs forming dilute pubescence over most of body, giving distinct sheen to head in certain lights and loose plush-like appearance to metasomal terga. Longer, slender, erect hairs numerous on gena, occiput, pronotum, propodeum, first metasomal tergum and legs, scattered on metasomal sterna.

Head.—Frons strongly produced into rather narrow, nasutiform projection, in lateral view truncate apically, bearing a pair of short, parallel ridges which are angulate posteriorly, posterior slope somewhat concave, in dorsal view, not bifurcate at apex; slightly curved row of three shallow dimple-like depressions immediately posterior to interantennal projection; medioapical margin of clypeus subtruncate, distinctly angled at junction with lateroapical margin; mandibles slender, long, dorsal tooth considerably shorter than ventral tooth, basal mandibular lamella low, convex; hypostomal carina produced into noticeable recurved tooth just mesad of posterior mandibular condyle, visible below mandibular lamella.

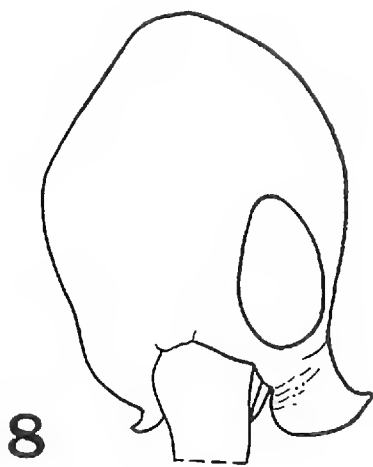
Mesosoma.—Propodeum in dorsal view wider than remainder of mesosoma. Width ratios of mesosomal nota: pronotum 1.00, propodeum 1.13; anterior tarsus with hairs of ventral basitarsal comb equal width of basitarsus at their bases; propodeum without carina near spiracles, posterolateral surfaces smooth.

Length.—4.45 mm.

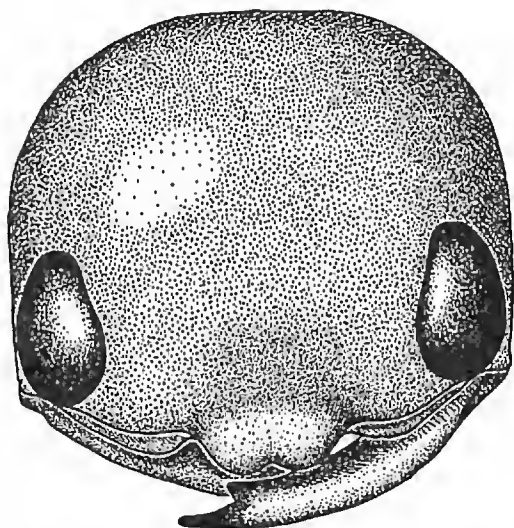
HOLOTYPE (UCD #794), 18 MILES WEST BLYTHE, RIVERSIDE COUNTY, CALIFORNIA, October 15, 1965, F. D. Parker collector (UCD). **Paratypes** (12): one female, Seeley, Imperial County, California, March 20, 1968, on ground at sundown, J. L. Johnson collector (MSW). One female, Imperial County, California, April, 1917, J. C. Bridwell collector (USNM). One female, Glamis, Imperial County, California, April 8, 1964, R. M. Bohart collector (MSW). One female, same locality, April 12, 1969, sand dunes, A. R. Hardy collector (UCR). One female, Cathedral City, Riverside County, California, April 11, 1941, ex: kangaroo rat burrow, Ross and Aarons collectors (CAS). One female, sand dunes, 7 miles southwest of Kclso, San Bernardino County, California, April 16–17, 1969, M. S. and J. S. Wasbauer



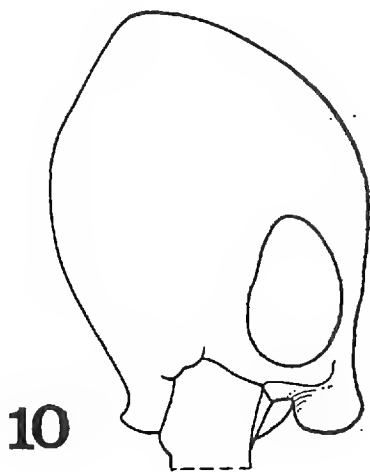
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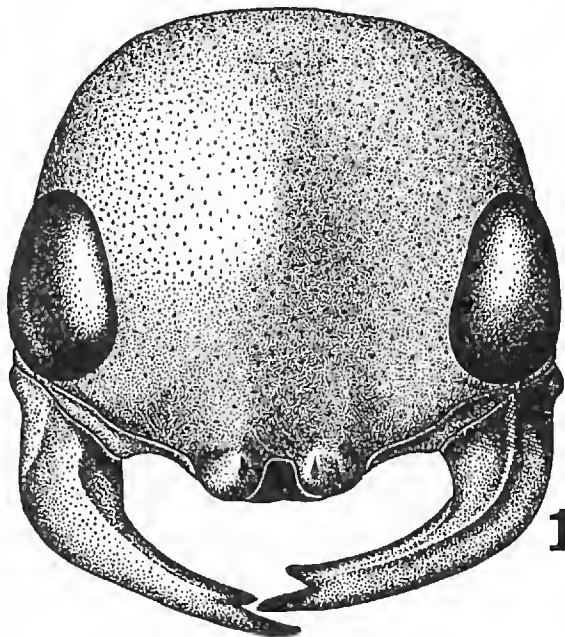
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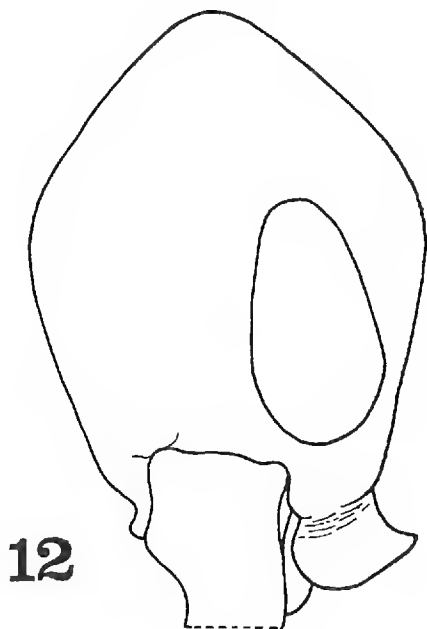
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collectors (MSW). One female, Vidal Junction, San Bernardino County, California, April 3, 1951, P. D. Hurd collector (CIS). Two females, Gila Bend, Arizona, March 26, 1940, R. H. Crandall collector (USNM). Two females, Tucson, Arizona, May, 1905, Wm. M. Wheeler collector (USNM).

Variation.—Length 3.46–5.22 mm.; pale integumental spots on second metasomal tergum comma-shaped to nearly round. Variation in the shape of these markings is evidently not geographically correlated, as both round and comma-shaped spots occur in population samples taken at Tucson, Arizona.

Dr. R. M. Bohart informs me that the holotype was collected at a mat of *Euphorbia* sp. *M. nasuta* shares with the following species the pronounced median nasutiform lobe which projects above the antennal sockets. It differs primarily in the shape of the lobe which in lateral view curves more strongly posteriorly and in posterior view is apically truncate.

***Myrmosula boharti* Wasbauer, new species**

(Figs. 13, 14)

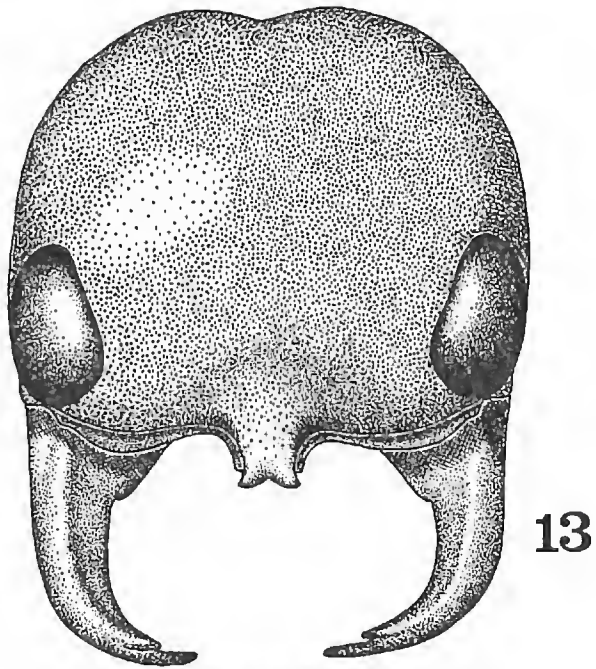
HOLOTYPE FEMALE.—Entirely orange-brown; ultimate tarsal segments darkened; tips of mandibular teeth reddish-black; first through fourth metasomal terga with dark brown apical band, interrupted medially on second; ultimate tergum entirely dark brown; second tergum with pair of anterolateral, creamy white, rounded spots; fifth tergum with medioapical rounded pale spot.

Entire insect shining, punctation minute, punctures on head uniformly small, separated by an average of less than their diameter; on mesosoma, faint, shallow, appearing as reticulations, posterior face of propodeum with a number of larger, shallow, irregular punctures; on metasoma, distinct, separated by slightly more than their diameters. Vestiture consisting of short, shining hairs mostly decumbent on head, mesosoma, first metasomal tergum, and second metasomal sternum, giving these parts distinct dilute sheen in certain lights; slightly longer, erect to suberect on second and succeeding metasomal terga and third and succeeding sterna; scattered, slightly longer, erect hairs over entire body, longest on metasomal sterna, most dense on posterior face of propodeum and first metasomal tergum.

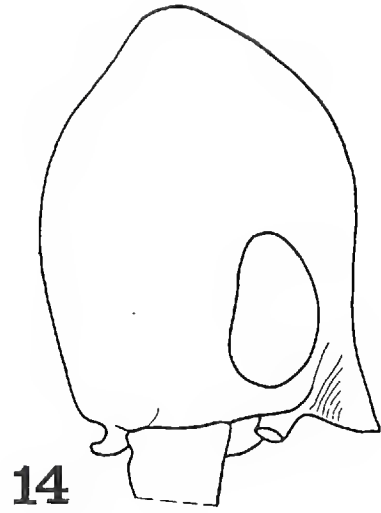
Head.—Frons strongly produced apically into rather narrow nasutiform interantennal elevation, in lateral view wedge-shaped anteriorly, nearly straight dorsally; in dorsal view with two divergent teeth at apex; frons without depressions posterior to interantennal elevation; medioapical margin of clypeus subtruncate, set off from lateroapical margin by small carina; mandibles stout, dorsal tooth subequal to ventral tooth, basal mandibular lamella low, margin flat for most of its length; hypostomal carina produced into very strong, recurved tooth just mesad of posterior mandibular condyle, visible below mandibular lamella.

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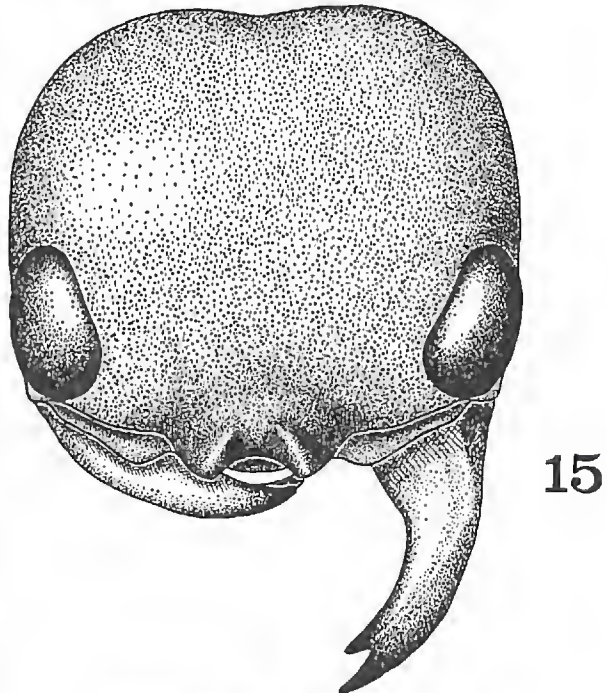
FIGS. 7–12. Heads of female Myrmosinae. Dorsal view on left, right lateral view on right. Figs. 7–8. *Myrmosula nasuta*. Figs. 9–10. *Myrmosula latericarinata*. Figs. 11–12. *Myrmosula peregrinatrix*.



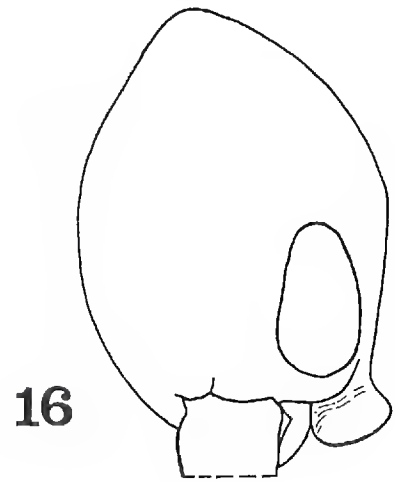
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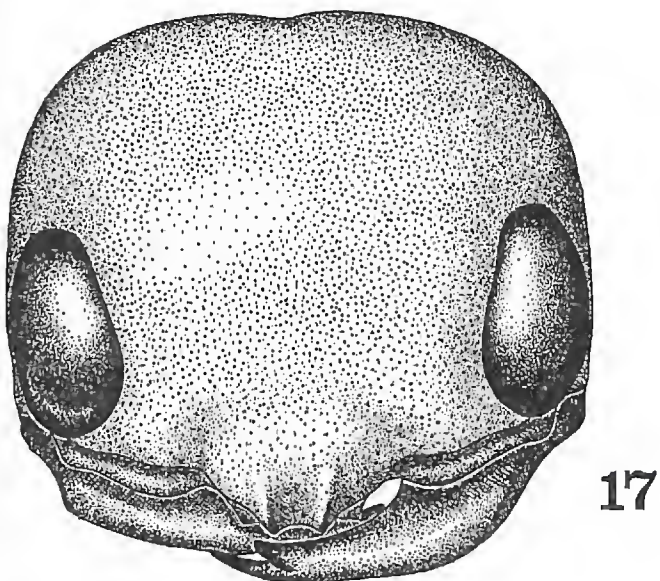
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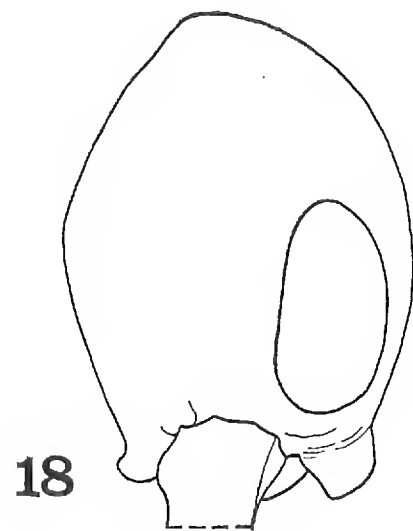
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Mesosoma.—Propodeum in dorsal view narrower than pronotum. Width ratios: pronotum 1.00; propodeum 0.910; anterior tarsus with hairs of ventral basitarsal comb equal width of basitarsus at their bases; propodeum without carina near spiracles, posterolateral surfaces smooth.

Length.—4.18 mm.

HOLOTYPE (UCD #795), THOUSAND PALMS, RIVERSIDE COUNTY, CALIFORNIA, April 9, 1964, R. M. Bohart collector. Paratype female, same data, F. D. Parker collector (UCD).

Dr. Bohart informs me that both the holotype and paratype were collected at mats of *Euphorbia* sp.

***Myrmosula latericarinata* Wasbauer, new species**

(Figs. 9, 10)

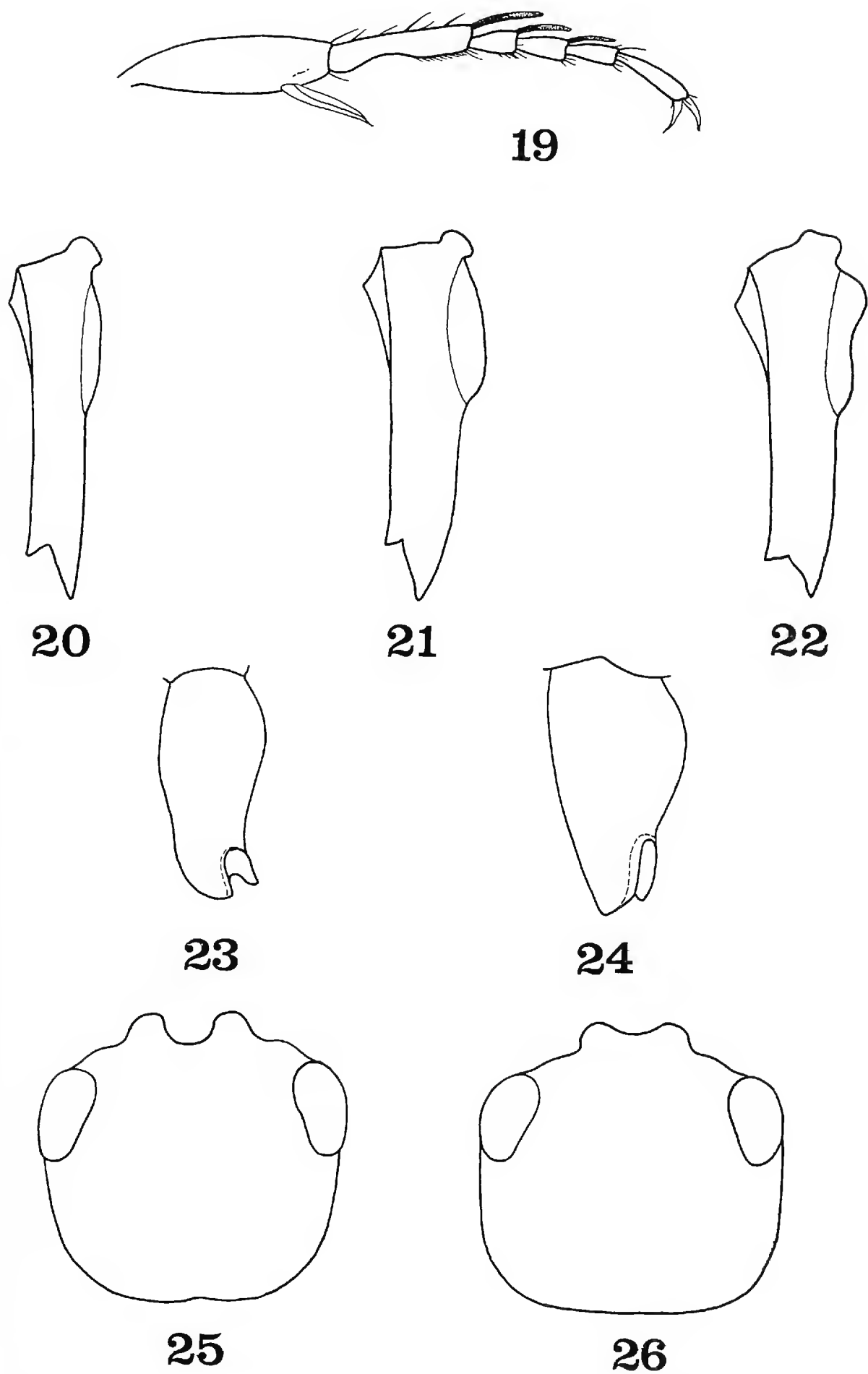
HOLOTYPE FEMALE.—Entirely orange-brown; tips of mandibles reddish-black; ultimate segment of antenna blackish; second and third metasomal terga with dark brown apical band, interrupted medially on second; apical tergum entirely dark brown; second metasomal tergum with pair of poorly defined, anterolateral, cream-colored spots. Entire insect mat to subshining, punctation minute, punctures on head separated by less than their diameter except narrow median band on frons; on disc of pronotum, slightly larger, separated by about their diameter; on mesonotum, separated by less than their diameter; on mesepisternum, very small, shallow, scattered, merging with reticulation; on posterior face of propodeum, sparse with scattered larger punctures; on metasomal segments, small distinct, separated by about or slightly more than their diameter. Vestiture consisting of very short, decumbent to longer, erect hairs giving distinct sheen in certain lights to head, mesosoma and parts of metasoma; erect hairs numerous, very short on head and dorsum of mesosoma, longer on occiput, anterior, declivous face of pronotum, posterior face of propodeum, first metasomal segment; scattered on succeeding metasomal sterna; scattered on coxae and femora ventrally.

Head.—Frons produced apically into low, rounded projection, in dorsal view, broadly bilobed at apex, in lateral view rounded, not strongly projecting dorsally; without dimple-like depressions posterior to projection; medioapical margin of clypeus slightly concave, distinctly angled at junction with lateroapical margin; mandibles stout, dorsal tooth weak, much shorter than ventral tooth; basal mandibular lamella relatively high, emarginate at broad, shallow notch; occipital carina present, well developed, not curving toward midline of head anteriorly; hypostomal carina produced into broad, rounded elevation mesad of posterior mandibular condyle, visible below mandibular lamella.

Mesosoma.—Pronotum with short dorsal surface and nearly vertical anterior declivity; mesonotum margined by sharp lateral angulation extending to propodeal spiracle; propodeum margined by lateral carina terminating in low tooth pos-

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FIGS. 13–18. Heads of female Myrmosinae. Dorsal view on left, right lateral view on right. Figs. 13–14. *Myrmosula boharti*. Figs. 15–16. *Myrmosula rutilans*. Figs. 17–18. *Myrmosula pacifica*.



FIGS. 19-26. Taxonomic characters of female Myrmosinae. Fig. 19. Left anterior tibia and tarsus, *Leiomyrmosa spilota*. Figs. 20-22. Lateral view, left

teriorly; propodeum in dorsal view narrower than pronotum. Width ratios: pronotum 1.00; propodeum 0.966; anterior tarsus with hairs of ventral basitarsal comb about half width of basitarsus at their bases.

Length.—4.84 mm.

HOLOTYPE (CAS #11897), LANITO, BAHIA CONCEPCION, TERRITORIO SUR DE BAJA CALIFORNIA, April 16, 1968, M. E. Irwin collector. Paratype female, 25 miles south Santa Rosalia, April 15, 1968, 200', dry wash, M. E. Irwin collector (UCR). The holotype has been placed on indefinite loan to the California Academy of Sciences from the collection of the University of California at Riverside.

KEY TO NEARCTIC GENERA OF FEMALE MYRMOSINAE

1. Clypeus with median spine or tooth; first metasomal sternum with large, conspicuous tooth or lamella; ocelli usually present; forms with heavy punctation and sculpture *Myrmosa*
 Clypeus simple; first metasomal sternum simple or with only very small, inconspicuous tooth; ocelli absent; relatively smooth forms without heavy punctation or sculpture 2
2. Mandibles with large apical tooth and two very small, low teeth on inner margin (fig. 1); ventral mandibular lamella absent; anterior tarsus with rake consisting of long, spatulate spine at outer apex of each segment (fig. 19); anterior coxa without tooth at apex (fig. 23) *Leiomyrmosa*
 Mandibles with two apical teeth (figs. 3, 5); ventral mandibular lamella present (figs. 20, 21, 22); anterior tarsus without rake; anterior coxa usually with at least small tooth at anterior apex (fig. 24) *Myrmosula*

KEY TO NEARCTIC SPECIES OF FEMALE MYRMOSULA

1. Antennal tubercles completely separated, frons between their bases not raised above remainder of frons (figs. 3, 11, 25) 2
 Antennal tubercles more or less fused into single interantennal elevation (figs. 5, 15); if bilobed, frons between base of lobes raised above remainder of frons (fig. 26) 3
2. Antennal tubercles separated by distance less than their basal width, each with small tooth posteriorly (figs. 11, 12) *peregrinatrix* Krombein
 Antennal tubercles separated by distance equal their basal width, rounded posteriorly (figs. 3, 4) *parvula* (Fox)
3. Mesonotum margined by sharp lateral angulation; propodeum with raised dorsolateral carina continuous with spiracle, terminating posteriorly in distinct tooth; interantennal elevation low, rounded, without teeth or ridges (figs. 9, 10) *latericarinata* Wasbauer
 Mesonotum not margined; propodeum sometimes with small posterolateral

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mandible of *Myrmosula* females. Fig. 20. *M. nasuta*. Fig. 21. *M. rutilans*. Fig. 22. *M. exaggerata*. Figs. 23–24. Left anterior coxa of female Myrmosinae. Fig. 23. *Leiomyrmosa spilota*. Fig. 24. *Myrmosula rutilans*. Figs. 25–26. Heads of *Myrmosula* females, posterior view. Fig. 25. *M. parvula*. Fig. 26. *M. rutilans*.

- tooth but without raised dorsolateral carina continuous with spiracle; interantennal elevation with low ridges dorsally or teeth at apex (figs. 13, 17) --- 4
4. Interantennal elevation strongly produced into nasutiform projection (figs. 7, 13); inferior margin of mandibular lamella evenly convex or nearly straight (fig. 20); anterior tooth of hypostomal carina distinct, recurved, visible below mandibular lamella when mandibles closed (figs. 8, 14) ----- 5
- Interantennal elevation not as strongly produced; either a) inferior margin of mandibular lamella emarginate (or highest near base) (fig. 22) or b) anterior tooth of hypostomal carina absent or very small, not visible below mandibular lamella when mandibles closed (fig. 16) ----- 6
5. In lateral view (fig. 14), interantennal elevation slender, wedge-shaped, anterior margin nearly straight; in posterior view, with two divergent apical teeth; at least indication of occipital carina present ----- *boharti* Washbauer
In lateral view (fig. 8), interantennal elevation stout, not wedge-shaped, anterior margin strongly curved; in posterior view, truncate with two small apical carinae; no indication of occipital carina present ----- *nasuta* Washbauer
6. Interantennal elevation with pair of pronounced ridges, convergent posteriorly, apex of elevation in dorsal view terminating above bases of antennae (fig. 15), inferior margin of mandibular lamella evenly convex (fig. 21) ----- *rutilans* (Blake)
Interantennal elevation with pair of low, parallel ridges, apex of elevation extending between bases of antennae (figs. 5, 17); inferior margin of mandibular lamella broadly, shallowly emarginate or highest near base at broad angle (fig. 22) ----- 7
7. Parallel ridges of interantennal elevation widely separated, distance between them nearly equal their length (fig. 17) ----- *pacifica* Mickel
Parallel ridges of interantennal elevation more closely spaced, distance between them equal to about half their length (fig. 5) ----- *exaggerata* Krombein

It seems likely that *Myrmosula pacifica* Mickel will prove to be a synonym of *M. exaggerata* Krombein. I have examined, in addition to the holotypes of both nominal species, a number of specimens from southern and central California localities. The only one which will run satisfactorily to *pacifica* in Mickel's key is a topotypic specimen collected by J. W. MacSwain on September 9, 1952. Even this specimen exhibits a very slight emargination on the inferior margin of the mandibular lamella. The majority of central California specimens have the ridges on the interantennal elevation more widely spaced than do the southern California specimens but the great majority have an emargination on the inferior margin of the mandibular lamella. Nearly all specimens examined have a depression on the frons, posterior to the interantennal elevation, including the holotype of *exaggerata*. Despite these considerations, however, the name *Myrmosula pacifica* Mickel should be retained until more information is available on interpopulation variation.

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SCIENTIFIC NOTE

New distribution and host record for the parasitoid *Heteroschema aeneiventris* (Hymenoptera: Pteromalidae)—Intensive collecting during 1971 and 1972 at Pescadero State Beach, San Mateo County, California has resulted in the discovery of a species of chalcid not previously known from the state. This is the first report of *Heteroschema aeneiventris* (Ashmead) in California and its parasitism of *Euarestoides acutangulus* (Thomson) (Diptera: Tephritidae), whose larvae destroy the staminate florets of beach bur, *Ambrosia chamissonis* (Lessing) Greene (Compositae), a prominent member of the coastal strand and dune community. The discovery of the parasitoid in the state is of particular interest because its previously known range in the United States was limited to Kansas (Peck, 1963, Can. Entomol. Suppl. 30: 629), Montana (Novak, 1967, Unpubl. M.S. Thesis, Kent State Univ., 102 pp.), New Mexico, Texas and Utah (Burks, per. commun.). The only other recorded host is the tephritid *Neotephritis finalis* (Loew) (Novak, loc. cit.).

Laboratory investigation has shown *H. aeneiventris* to be a primary, internal, solitary larval-pupal parasitoid. Of 460 field-collected *E. acutangulus* puparia, 40% were parasitized by this chalcid. The wasp is bivoltine in coastal California, with peak emergence periods in mid-July and mid-September.

The writer is indebted to Dr. B. D. Burks, U. S. N. M., Washington, D. C., for the identification of the parasitoid and to the California Department of Parks and Recreation for permission to collect at the designated area.—GARY L. PIPER, *Department of Entomology and Parasitology, University of California, Berkeley, 94720.*